

convinced that it is not the input price index that corresponds to the inputs used by BLS in its calculation of TFP growth for the U.S. nonfarm sector. The simulation below uses the correct BLS price index.

5. THE 1999 STAFF MODEL INCLUDES INCORRECT AND/OR INCONSISTENT DATA POINTS

The 1999 staff model incorporates a number of data errors quite apart from the methodological errors discussed above. Each data error is discussed below and previously was identified in detail in one or more of three USTA filings: (1) Appendix F in Attachment D to USTA Comments dated October 26, 1998; (2) Appendix A to Gollop report "Current Issues in Modeling the Commission's X-Factor: A Rebuttal of IXC Arguments" filed in USTA ex parte dated April 14, 1999; and (3) Appendix B to Gollop report "The FCC X-Factor: 1996-98 Update" filed with USTA ex parte dated September 10, 1999. Appendix A to this report is a compendium of these past filings.

- 1) Most of the data entries for 1998 differ from those found in USTA's update of the Commission's 1997 model (filed September 10, 1999). The entries in the 1999 staff model typically are higher than those found in USTA's update. The difference is explained by the staff's inclusion of Southern New England Telephone (SNET) in its 1998 data. SNET, however, does not appear in the staff's 1985-97 data series. The USTA updates and following simulation exclude SNET to insure consistency over the complete 1985-98 data set.
- 2) Both 1997 and 1998 data entries for special access lines in the staff model are in error. The correct data values appear in the USTA update filed with the Commission on September 10, 1999 and are used in the simulation developed below.

- 3) Both USTA and the FCC staff estimated a 1998 value for intrastate DEMs. The higher USTA number is adopted in the following simulation since it produces a more conservative result (i.e., it produces a higher X). The provisional entry will be revised once final data are available.
- 4) USTA previously demonstrated in its Comment dated October 26, 1998 and its ex parte filing dated April 14, 1999 that the published 1996 data entry for labor compensation was obviously in error.⁸ Published data adopted by the staff in its 1999 model show an annual compensation per employee series with the following trend from 1995 to 1997: \$46,717, \$54,601, and \$51,605.⁹ Even Dr. Norsworthy, AT&T's productivity expert, acknowledged that this series contained an obvious error: "Total labor compensation for the RBOCs shows an implausibly large increase in 1996, followed by a similar decrease in 1997."¹⁰ USTA made clear in its October 1998 filing that the upward spike observed for 1996 labor compensation is the result of changing FCC reporting requirements for labor compensation. USTA therefore replaced the reported 1996 compensation with an estimate whose calculation is fully described on page 5 of Attachment D to USTA's October Comment.¹¹ This led to a 1995-97 per employee labor compensation series of \$46,717, \$49,100, and \$51,605. Only the 1996 data point is replaced.¹² Simple inspection of the contrasting annual wage series leaves little doubt as to which series better satisfies the Commission's economic meaningfulness standard. This latter series has been used in all USTA updates of the FCC May 1997 model and is also used in the simulation developed in the following section of this report.

⁸ Attachment D to USTA's Comment dated October 26, 1998, Docket 94-1; and Gollop report "Current Issues in Modeling the Commission's X-Factor: A Rebuttal of IXC Arguments" filed with USTA ex parte dated April 14, 1999

⁹ Table B-5, FNPRM, dated November 12, 1999.

¹⁰ Attachment A to AT&T Reply Comment dated November 9, 1998, CC Docket 94-1, p. 2.

¹¹ Chart D6 in Appendix A to Attachment D to USTA's Comment dated October 26, 1998, Docket 94-1.

¹² As explained in USTA's October 1998 filing, reported operating expense for 1996 is not affected by USTA's correction for labor compensation. The reduction in labor compensation results in a corresponding increase in material expense for that year.

The labor price series adopted by the staff in its 1999 model differs in two important respects from that used by USTA in its past updates of the FCC model and in the simulation discussed in the following section. The staff labor price series is based on (i) the 1996 data error discussed immediately above and (ii) ad hoc “disallowances” for LEC severance payments discussed in section 2 above. A comparison of the staff’s proposed labor price series in its 1999 model with not only the series applied by USTA but with the labor price series reported for the U.S. nonfarm business sector makes clear the extent (and importance) of these two errors alone in the 1999 staff model.

Table 5 presents the three series in index form. The USTA and 1999 staff labor price series are taken, respectively, from USTA’s 1998 update of the Commission’s May 1997 model (filed September 1999) and Table B-5 in the Commission’s FNPRM (November 1999). The corresponding price series for workers in the nonfarm sector is taken from Table B-49 in the Economic Report of the President (February 1999). This latter series reflects wages, salaries and benefits and therefore is directly comparable to the USTA and staff labor price indexes. A simple visual comparison of the three series shows that LEC labor prices, as measured by the staff in its 1997 model and in USTA updates, move quite similarly to hourly compensation rates in the nonfarm economy. Both series increase steadily over the 1990-98 period. In contrast, labor prices in the staff’s 1999 model (i) remain relatively flat from 1990 to 1994 while nonfarm hourly compensation increased by nearly 15%, (ii) increase by an inexplicable 23 percentage points in one year (1995 to 1996) while U.S. compensation increased by only 4 points, and (iii) then falls by three percentage points from 1996 to 1997 as the U.S. series increased by 4.5 percentage points. The staff offers no explanation for why LEC hourly compensation rates should be expected to move in a pattern so unrelated to U.S. experience. Since the X-Factor depends importantly on the labor price series, Table 5 illustrates persuasively, for the labor component alone, the extent of data bias underlying the staff’s 1999 model.

Table 5
Labor Price Series

Year	1997 Staff Model	Staff 1999 Model	U.S. Nonfarm Business Sector
	USTA 9/99 Filing (Chart D6)	FCC 11/99 FNPRM (Table B-5)	Economic Report of the President (Table B-49)
1990	1.00	1.00	1.00
1991	1.04	1.01	1.05
1992	1.05	0.99	1.10
1993	1.14	1.04	1.13
1994	1.18	1.03	1.15
1995	1.18	1.07	1.18
1996	1.24	1.30	1.22
1997	1.30	1.27	1.26
1998	1.35	1.31	1.32

6. CORRECTED 1999 STAFF MODEL

The 1999 staff model has been modified to correct the errors identified in the preceding five sections of this report. In particular, the following adjustments have been made:

- 1) An external rate of return adjustment like that proposed in the 1999 staff model is applied, but with three modifications. First, movements in LEC opportunity costs are pegged to movements in the rate of return reported for the 875 largest Value Line industrials (Table 1). Second, the adjustment was made only to that portion of LEC property income that corresponds to earnings (Table 2). Third, no adjustment is made to property income for years 1985-91, a period under rate-of-return regulation. Each methodological step is displayed in full in Chart D9 in Appendix B to this report. In brief, LEC earnings per unit of capital are adjusted by the full basis point change in the Value Line rate of return to obtain an external rate of return for LEC opportunity costs. The result is multiplied by the LECs' capital stock to measure earnings corresponding to opportunity costs. These imputed earnings are then added to that portion of property income unaffected by the adjustment, i.e., the portion corresponding to depreciation, amortization, and income taxes. The adjusted series for property income, rental price, and total LEC costs are reported in Appendix B in columns H and G of Chart D9 and column D of Chart D10, respectively.
- 2) As required by the conversion from an internal to an external rate of return model, no change is made to LEC revenues, taxes, or operating expenses. Intrastate and interstate revenue totals and LEC operating expenses are returned to the data series found in USTA's update of the 1997 staff model (filed with the Commission on September 10, 1999).
- 3) Severance payments are included in LEC labor expense totals. The corrected model has the same labor expense series as found in USTA's update of the 1997 staff model. See column B of Chart D6 in attached Appendix B.

- 4) Local output is measured by the number of access lines rather than by calls or local DEMs. See the fourth column of Chart D5 in Appendix B.
- 5) The correct BLS input price series for the nonfarm business sector is used. See column B of Chart D1 in attached Appendix B.
- 6) Data point errors in the staff model are corrected as described in section 5 above.

Table 6 presents a comparison of the 1997, uncorrected 1999, and corrected 1999 staff models. The X-Factors reported for the 1997 model are taken from USTA's update of that model filed with the Commission on September 10, 1999. The uncorrected 1999 staff results are taken from the Table B-12 in Appendix B in the November 15, 1999 FNPRM. The corrected 1999 staff results are taken from Chart D1 in Appendix B to this report.

The differences between the uncorrected and corrected 1999 staff models have already been summarized in the six items introducing this section. The differences between the 1997 and corrected 1999 staff models can be summarized as follows. For the 1986-91 period, the corrected 1999 model substitutes access lines for local calls. In all other respects the two models are identical for that subperiod. For the 1992-98 period, there are two important differences. Access lines are used in place of local calls and the embedded internal rate of return is replaced with an economically meaningful external rate of return.

The subperiod averages at the bottom of Table 6 indicate that the three models generate considerably different results for the price-cap period. Though the models produce very different annual results for the pre-1991 era, the five-year 1986-90 averages differ only slightly. The differences post 1990, however, are striking. The 1999 staff model as designed by the staff in the FNPRM raises the average annual X-Factor by more than two full percentage points in the full 1991-98 period. However, when corrected so as to be made consistent with economic principles, the corrected 1999 model reduces X relative to the 1997 staff model. The conversion from calls to access lines raises LEC output and,

Table 6
X-Factors

Year	1997 Staff Model USTA 9/99 Filing	1999 Staff Model	
		Uncorrected FCC 11/99 FNPRM	Corrected Appendix B to this Report
1986	-1.13%	11.53%	-0.54%
1987	6.36	4.19	6.98
1988	6.42	1.81	6.75
1989	6.52	5.14	6.22
1990	8.99	4.87	8.48
1991	6.06	3.61	6.18
1992	3.08	8.45	1.68
1993	3.51	8.49	-0.30
1994	5.47	3.62	1.53
1995	6.20	6.52	2.98
1996	1.98	7.73	4.98
1997	3.62	6.71	3.55
1998	3.03	5.54	5.73
1986-90	5.43	5.51	5.58
1991-98	4.12	6.33	3.29
1994-98	4.06	6.02	3.76

other things equal, increases the X-Factor. However, converting from an internal to an appropriate external rate of return reduces X. On net, X-Factors are reduced by an average 0.83 percentage points per year in the 1991-98 period. If one looks at the most recent five-year period, the interval used by the Commission to set X in its May 1997 order, the 1999 staff model raises X by nearly two percentage points relative to the 1997 model, while the corrected 1999 model generates an X-Factor 0.3 percentage points lower than that computed by the 1997 staff model.

The important conclusion to be drawn from Table 6 is that the X-Factor is quite sensitive to modeling errors. In particular, the importance of properly modeling an external rate of return should be evident. If the Commission decides to endorse an X-Factor model calibrated on an external rate of return, it is incumbent on the Commission to implement the model in a way consistent with sound economic principles.

This importance of this point cannot be overemphasized. Properly implementing an external rate-of-return framework will not be an easy task. It is important to note that while the corrected staff model presented in this report illustrates how one would go about properly converting the staff's model to an external rate of return status, the empirical comparison presented in Table 6 should be considered to be an illustration only. First, as explained in section 1.b. above, the portion of LEC property income that corresponds to the dollar earnings subject to adjustment must be reduced beyond the levels reported in Table 2. The "earnings" series used for the corrected 1999 staff model as an illustration in this report include capital expense items that should not be subject to adjustment (e.g., property taxes and business transfers). Second, no external rate of return adjustment is made at present to the BLS TFP and input price series for the U.S. nonfarm business sector though, as argued in section 1.e. above, symmetry requires that such an adjustment would be absolutely necessary if the Commission were to adopt the staff's recommended external rate of return framework. Implementing an external rate-of-return framework that properly addresses these issues would require considerable effort.

7. RECENT BEA REVISIONS TO U.S. NATIONAL ACCOUNTS

REDUCE THE X-FACTOR

The Bureau of Economic Analysis released revisions to its GDP accounts on October 28, 1999. A number of factors contributed to the revision but the single largest one was BEA's treatment of computer software. In the past, software was treated as an intermediate input and therefore did not enter the GDP accounts. Now it is treated as a capital good. A November 8, 1999 Business Week article summarizes well the effect of the GDP revision on nonfarm statistics:

The U.S. truly has seen the birth of a New Economy over the past several years. That's one way to read the results of a comprehensive revision of historical data on the gross domestic product released on Oct. 28 by the Commerce Dept.'s Bureau of Economic Analysis.

The most stunning data in the report are about the acceleration of productivity in the 1990s. Official revisions of productivity data, incorporating the latest output figures from Commerce, won't be released by the Labor Dept. until Nov. 12. But a BUSINESS WEEK analysis of the new data from the Commerce Dept. shows that nonfarm business productivity growth in this decade will likely be revised upward, to roughly 2% a year, from 1.4%. Productivity growth will be boosted for the 1980s as well, but not by as much....

A new calculus for software investments accounted for about two-thirds of the upward revision in GDP. And since software sales are growing far faster than the economy as a whole, adding them into the GDP raises the economy's official growth rate—and will likely continue doing so for years to come.

As advertised in the Business Week article, BLS released revised labor productivity growth rates for the nonfarm economy this past November. (Multifactor indexes will not be available until next spring.) Annual rates of labor productivity growth increased from previously reported 1.15% and 1.43% annual rates over the 1985-98 and 1991-98 periods to 1.69% and 1.96% annual rates, respectively. (www.bls.gov) Over both the full study period used in the FCC models and the shorter price cap period, the GDP revisions produce an additional 0.5 percentage points per year in nonfarm productivity growth.

The BEA/BLS revisions, when incorporated into the Commission's model, will decrease both the TFP differential and the measured X-Factor. No adjustment is incorporated into the present analysis because BLS has not yet produced the requisite TFP numbers and the 0.5% increment noted above will be reduced a bit due to the inclusion of the now faster growing capital input in the TFP metric. However, in anticipation of the BLS release midyear 2000, provision should be made now for the incorporation of the revised nonfarm series as soon as it is released by BLS.

8. CONCLUSION: PROPER PRODUCTIVITY ACCOUNTING

Changes should be made to the Commission's 1997 model only when clear and unambiguous errors have been detected. As the staff acknowledges in the current FNPRM in a section discussing incentive regulation: "The simple fact that the **X-factor is fixed** and independent of the actual costs incurred creates an incentive for the firm to be efficient." (p. 42, FNPRM, Nov. 15, 1999; emphasis added) It is the lure of profits and the regulatory promise that firms may keep those profits once earned that stimulates productivity growth. In short, properly designed incentive regulation requires that the "rules of the game" not be changed. Ex post "adjustments" designed to reduce earnings run the risk of diminishing incentives and therefore the efficiency payoffs to be shared between firms and consumers.

Should the LECs be suspicious of the "adjustments" proposed by the staff for the Commission's 1997 model? The answer is found in the introductory section to the November 1999 FNPRM:

A third alternative is to prescribe an X-factor based on the results of another staff study which directly determines, from aggregate interstate expenses and revenues, the X-factor that would have produced a competitive level of capital compensation in the interstate jurisdiction during the period between performance reviews. (p. 2, FNPRM, Nov. 15, 1999)

In place of an X determined from an analysis of productivity performance defined on a set of economically meaningful data accounts, the staff recommends an X backed out of a rate-of-return analysis based on accounting separations. In addition, it cannot have escaped the LECs' notice that each and every "adjustment" proposed by the staff to the Commission's present X model coincidentally leads to a higher X.

This said, if clear and unambiguous errors are found to exist in the May 1997 model, modifications should be made. Alternatively, errors embedded in the staff's 1999 proposal must not be transported to the Commission's X-Factor model. The analysis developed in this report suggests that only two of the staff's proposed changes should receive serious consideration by the Commission. One tends to raise X, the other to lower it. First, the staff argues that the exogenous effect of rising Internet usage makes calls no longer a meaningful measure of local output. This position is consistent with economic principles but these same principles identify access lines, not local DEMs, as the meaningful successor metric. Increasing faster than calls, the substitution of access lines, with second-line growth largely driven by Internet and fax use, raises X. Second, while economic principles can be used to support the use of either internal or external rates of return in differing applications, these same economic principles are uncompromising when it comes to how external rates of return are to be incorporated into the rental price of capital. They must be applied only to that portion of property income corresponding to LEC earnings and must measure the LECs' true opportunity costs. Proper capital cost accounting leads to a lower X as reported in Table 6, the expected result given the Commission's aggressive application of a 6.5% X-Factor not otherwise justified by the Commission's own model.

Both the FCC's 1997 model as well as a properly designed 1999 staff model lead to the same policy conclusion. A straightforward application of elementary economic principles indicates that the present 6.5% X-Factor is not justified by any meaningful measure of LEC performance. The FCC's own model (May 1997) as well as the corrected 1999 staff model reveal that the LECs have never achieved a 6.5% X in any year since the

initiation of price-cap regulation. The 1991-98 and 1994-98 average X-Factors in the Commission's 1997 model were 4.12 and 4.06, respectively. The corresponding averages in the corrected 1999 staff model are 3.29 and 3.76, respectively.

APPENDIX A

Compendium of Data Errors

Previously Filed with the Commission

**FOLLOWING 5 PAGES
WERE FILED AS
APPENDIX F IN ATTACHMENT D
TO USTA COMMENTS
DATED OCTOBER 26, 1998**

FCC STAFF'S PRODUCTIVITY MODEL (6.5% X-factor basis)
 1996-97 BOC Industry DATA UPDATE

PAGE 1

FCC CHART D2, D3	FCC Model	UPDATE	UPDATE
	1995	1996	1997
Inter. End User Revenue	\$5,770,285	\$5,930,960	\$6,268,026
S.O.C.C., Table 2.9, line 154	3.23%	2.78%	5.68%
Inter Switched Access	\$9,332,869	\$9,409,639	\$8,763,815
S.O.C.C., Table 2.9, line 155	0.42%	0.82%	-6.86%
Inter Special Access	\$2,529,667	\$3,070,598	\$3,851,028
S.O.C.C., Table 2.9, line 156	14.10%	21.38%	25.42%
<i>TOTAL INTERSTATE REVS</i>	<i>\$17,632,821</i>	<i>\$18,411,197</i>	<i>\$18,882,869</i>
	3.11%	4.41%	2.56%
Local Service Revenue	\$37,684,860	\$40,523,387	\$42,460,592
S.O.C.C., Table 2.9, line 153	5.39%	7.53%	4.78%
Intra. Toll & Access	\$13,123,225	\$12,987,476	\$12,308,613
S.O.C.C., Table 2.9, l 157+174	-8.59%	-1.03%	-5.23%
<i>TOTAL INTRASTATE REVS</i>	<i>\$50,808,085</i>	<i>\$53,510,863</i>	<i>\$54,769,205</i>
	1.38%	5.32%	2.35%
<i>GRAND TOT REVS (-MISC)</i>	<i>\$68,440,906</i>	<i>\$71,922,060</i>	<i>\$73,652,074</i>
	1.82%	5.09%	2.41%

FCC STAFF'S PRODUCTIVITY MODEL (6.5% X-factor basis)
1996-97 BOC Industry DATA UPDATE

PAGE 2

	FCC Model	UPDATE	UPDATE	
FCC CHART D4, D5	1995	1996	1997	
Switched Acc Line - <i>Mobile</i> SOCC Table 2.10	119,887,506 4.01%	125,333,996 4.54%	131,458,355 4.89%	
Switched Acc Minutes SOCC Table 2.10	334,981,582 332,335,499 12.30%	362,159,904 359,299,134 8.11%	387,587,697 384,526,068 7.02%	Estimated, using growth rates shown on to FCC '95 quantity
Special Acc Lines <i>Dig+Anlog</i> SOCC Table 2.10	16,107,677 16.52%	20,775,150 28.98%	24,479,958 17.83%	< revised vs. reported
Local Call Volume SOCC Table 2.10	409,383,799 4.27%	422,262,867 3.15%	433,086,737 2.56%	< revised vs. reported
Intrastate DEMs	246,926,539 4.91%	258,038,233 4.50%	269,649,954 4.50%	Est'd pending release of Joint Board Monitoring Report
FCC CHART D6				
Total Employees <i>Stat of C. C. Table 2.9, line 321</i>	346,843 -5.54%	338,040 -2.54%	338,177 0.04%	
Total Compensation \$000 <i>Stat of C. C. Table 2.9, line 324</i>	\$16,203,522 -5.54%	\$16,597,889 2.43% normalized vs. reported	\$17,451,673 5.14%	

FCC STAFF'S PRODUCTIVITY MODEL (6.5% X-factor basis)
1996-97 BOC Industry DATA UPDATE

PAGE 3

FCC CHART D7	FCC Model	UPDATE	UPDATE
	1995	1996	1997
TPIS - BOY	\$209,325,562	\$217,430,207	\$227,317,120
SOCC, Tab 2.7 (Ac260-2111)	3.07%	3.87%	4.55%
Unadj. Additions	\$15,374,568	\$18,026,150	\$18,253,199
SOCC, Tab 2.7 (Ac260-2111)	4.46%	17.25%	1.26%
TPIS - EOY	\$217,430,207	\$227,317,120	\$236,896,179
SOCC, Tab 2.7 (Ac260-2111)	3.87%	4.55%	4.21%
<i>Retires = BOY+Adds-EOY</i>	\$7,269,923	\$8,139,237	\$8,674,140
Depreciation Accruals	\$15,358,553	\$16,252,281	\$16,667,034
SOCC Tabl 2.9, I 250+252	3.33%	5.82%	2.55%

FCC STAFF'S PRODUCTIVITY MODEL (6.5% X-factor basis)
 1996-97 BOC Industry DATA UPDATE

PAGE 4

FCC CHART D8	FCC Model	UPDATE	UPDATE
	1995	1996	1997
Operating Expense SOCC Tabl 2.9, line 280	\$56,831,094 1.63%	\$57,884,494 1.85%	\$59,731,175 3.19%
Depreciation & Amortiz. SOCC Tabl 2.9, line 255	\$15,556,284 3.24%	\$16,377,242 5.28%	\$16,758,832 2.33%
Employee Compensation Stat of C. C. Table 2.9, line 324	\$16,203,522 -5.54%	\$18,457,448 13.91%	\$17,451,673 -5.45%
Materials = OpExp-Dep-Comp calc	\$25,071,288 5.81%	\$23,049,804 -8.06%	\$25,520,670 10.72%

USTA 1996/97 UPDATE OF FCC PRODUCTIVITY MODEL
MODEL DATA ADJUSTMENTS TO REPORTED BOC INDUSTRY DATA

Item	YEAR	Model Exhibit	Data Item	BOC Total REPORTED	BOC Total REVISION/Estimate	% CHG	EXPLANATION
1	1996	D5	Intrastate DEMs	Not released	258,038,233,255	4.50% over '95	Estimate, pending release of latest Joint Board Monitoring Report
2	1996	D4	Switch Acc Minutes	Not released	362,159,903,714	8.11% over '95	Estimate, pending Joint Board publication Used growth rates for Interstate interlata billed access minutes from Table 2.10, Stat. Of Comm. Common Carriers
3	1996	D6	Labor Compensation	\$18,457,448,000	16,597,889,075	-10.07%	Normalized value substituted to reflect change in reporting basis after FCC clarification to include benefits \$
1	1997	D5	Intrastate DEMs	Not released	269,649,953,751	4.50% over '96	Estimate, pending release of latest Joint Board Monitoring Report
2	1997	D4	Switch Acc Minutes	Not released	387,587,696,669	7.02% over '96	Estimate, pending Joint Board publication Used growth rates for Interstate interlata billed access minutes from Table 2.10, Stat. Of Comm. Common Carriers
3	1997	D5	Local Calls (000)	408,389,023,000	433,086,737,000	6.05%	Revision to New York Tel.
4	1997	D4	Special Acc Lines	27,891,558	24,479,958	-12.23%	Revision to US West Revision to New York Tel.

A-6

**FOLLOWING PAGE
WAS FILED AS
APPENDIX A TO
GOLLOP REPORT**

**“CURRENT ISSUES IN MODELING THE COMMISSION’S
X-FACTOR: A REBUTTAL OF IXC ARGUMENTS”**

**USTA EX PARTE
DATED APRIL 14, 1999**

APPENDIX A

Data Updates for FCC Model

Output volume data for switched access minutes, intrastate DEMs, and local calls, not previously available to either USTA or AT&T for their respective October and November 1998 analyses, now are published in final form in the FCC Statistics of Communications Common Carriers and the Joint Monitoring Report. A complete summary of the data values at issue follows in Table 1. Underlined values identify data used in the FCC update.

Published data are used in the March 1999 USTA update in all instances except for special access lines in 1997. Published FCC data for 1997 special access lines do not reflect revisions to US West and New York Telephone data recently submitted to the Commission. In the two instances where provisional estimates are required, the estimate most favorable to the IXC position is adopted (the USTA estimate for switched access minutes in 1997 and AT&T's estimate for intrastate DEMs in 1997).

Table 1

(Underlined values identify data used in the FCC update.)

	Year	USTA Oct. 26, 1998	AT&T Nov. 9, 1998	New SOCCC and Joint Board Monitoring Report	Explanation
Switched Access Minutes	1996	362,159,903,714	362,602,512,000	<u>363,445,050,000</u>	Recently published
	1997	<u>387,587,696,669</u>	386,566,932,000	(not available)	
Intrastate DEMs	1996	258,038,233,000	263,719,641,000	<u>263,719,641,000</u>	Recently published
	1997	269,649,954,000	<u>273,526,579,891</u>	(not available)	
Local Calls	1997	433,086,737,000	437,613,306,121	<u>433,128,073,000</u>	Final FCC SOCCC reflects NY Tel revision
Special Access Lines	1997	<u>24,479,958</u>	27,891,558	28,051,449	USTA total reflects revisions to US West and NY Tel data

FOLLOWING 4 PAGES

WERE FILED AS

APPENDIX B TO

GOLLOP REPORT

“THE FCC X-FACTOR:

1996-98 UPDATE”

USTA EX PARTE

DATED SEPTEMBER 10, 1999

FCC STAFF'S TFP PRODUCTIVITY MODEL

(4th Report & Order, May 21, 1997, CC Docket 94-1)

USTA's UPDATE for 1998

(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)

FCC CHART D2, D3	FCC Model Data 1998	
Inter. End User Revenue	\$7,807,872	
S.O.C.C., Table 2.9, line 154	24.6%	<- Annual change
Inter Switched Access	\$7,275,241	
S.O.C.C., Table 2.9, line 155	-17.0%	
Inter Special Access	\$4,815,249	
S.O.C.C., Table 2.9, line 156	25.0%	
TOTAL INTERSTATE REVS	\$19,898,362	
	5.4%	
Local Service Revenue	\$44,993,354	
S.O.C.C., Table 2.9, line 153	6.0%	
Intra. Toll & Access	\$11,978,176	
S.O.C.C., Table 2.9, l 157+174	-2.7%	
TOTAL INTRASTATE REVS	\$56,971,530	
	4.0%	
GRAND TOT REVS (-MISC)	\$76,869,892	
	4.4%	

S.O.C.C. for 1998 refers to the
FCC's "Preliminary Statistics of
Communications Common Carrier
dated May 28, 1999

<p>FCC STAFF'S TFP PRODUCTIVITY MODEL</p>
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<p>(4th Report & Order, May 21, 1997, CC Docket 94 -1)</p>
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<p>USTA's UPDATE for 1998</p>

<p>(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)</p>
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FCC CHART D4, D5**FCC Model Data
1998**

Switched Acc Line -Mobile
SOCC Table 2.10

136,170,133
3.6%

<- Annual change

Switched Acc Minutes
SOCC Table 2.10

407,903,661
404,681,553
5.2%

<- Projection prior to Joint Board reporting
<- ADD 1,865,240 for Bell Atl. - North revision

Special Acc Lines Dig+Anlog
SOCC Table 2.10

31,620,187
29.2%

<- ADD 52,416 for SBC - Nevada revision, also
DECREASE 2,583,895 for Bell Atl. - North revision

Local Call Volume
SOCC Table 2.10

444,538,659
2.6%

<- DECREASE 9,796,480 for Pacific, NV revision

Intrastate DEMs

296,776,339
8.5%

<- Projection prior to Joint Board reporting

FCC CHART D6

Total Employees

338,404

Stat of C. C. Table 2.9, line 321

0.1%

Total Compensation \$000

\$18,128,861

Stat of C. C. Table 2.9, line 324

3.9%

<- ADD \$207,702 for US West revision

<p>FCC STAFF'S TFP PRODUCTIVITY MODEL</p>
--

<p>(4th Report & Order, May 21, 1997, CC Docket 94 -1)</p>
--

<p>USTA's UPDATE for 1998</p>

<p>(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)</p>
--

FCC CHART D7**FCC Model Data
1998**

TPIS - BOY	\$236,896,179	
SOCC, Tab 2.7 (Ac260-2111)	4.2%	<- Annual change
Unadj. Additions	\$18,553,791	
SOCC, Tab 2.7 (Ac260-2111)	1.6%	
TPIS - EOY	\$248,970,288	
SOCC, Tab 2.7 (Ac260-2111)	5.1%	
<i>Retires = BOY+Addns-EOY</i>	\$6,479,681	<- calc
Depreciation Accruals	\$17,154,619	
SOCC Tabl 2.9, I 250+252	2.9%	

FCC STAFF'S TFP PRODUCTIVITY MODEL

(4th Report & Order, May 21, 1997, CC Docket 94 -1)

USTA's UPDATE for 1998

(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)

FCC CHART D8	FCC Model Data 1998	
Operating Expense SOCC Tabl 2.9, line 280	\$60,836,253 1.9%	<- Annual change
Depreciation & Amortiz. SOCC Tabl 2.9, line 255	\$17,306,863 3.3%	
Employee Compensation Stat of C. C. Table 2.9, line 324	\$18,128,861 3.9%	<- same value as on Chart D6
<i>Materials = Op.Exps.-Deprec.-Compens.</i>	\$25,400,529 -0.5%	<- calc

APPENDIX B

Corrected 1999 Staff Model

Chart D1: Components of FCC LEC Price Cap X-Factor [Excluding CPD]

Year	Input Price Growth Rates			Total Factor Productivity Growth Rates			LEC
	Total	U.S. Nonfarm	Differential	Total	U.S. Nonfarm	Differential	Price/Productivity
	RBOCs A	Business Sector B	C=B-A	RBOCs D	Business Sector E	F=D-E	Differential G=C+F
1984							
1985							
1986	5.20%	2.33%	-2.87%	3.43%	1.10%	2.33%	-0.54%
1987	0.72%	3.45%	2.73%	3.85%	-0.40%	4.25%	6.98%
1988	-1.39%	5.02%	6.41%	0.65%	0.30%	0.35%	6.75%
1989	-2.40%	2.42%	4.82%	1.60%	0.20%	1.40%	6.22%
1990	1.86%	3.31%	1.45%	6.32%	-0.70%	7.02%	8.48%
1991	-0.69%	1.77%	2.46%	2.30%	-1.41%	3.72%	6.18%
1992	3.25%	3.15%	-0.10%	3.40%	1.61%	1.78%	1.68%
1993	6.26%	2.18%	-4.09%	3.88%	0.10%	3.78%	-0.30%
1994	3.08%	3.37%	0.28%	1.65%	0.40%	1.25%	1.53%
1995	4.20%	2.61%	-1.58%	4.86%	0.30%	4.56%	2.98%
1996	3.40%	3.00%	-0.40%	6.86%	1.48%	5.38%	4.98%
1997	2.03%	2.30%	0.27%	3.67%	0.39%	3.28%	3.55%
1998	1.41%	2.69%	1.28%	5.04%	0.59%	4.45%	5.73%
Averages							
[1986-94]	1.77%	3.00%	1.23%	3.01%	0.13%	2.88%	4.11%
[1986-95]	2.01%	2.96%	0.95%	3.19%	0.15%	3.04%	4.00%
[1987-95]	1.65%	3.03%	1.38%	3.17%	0.04%	3.12%	4.50%
[1988-95]	1.77%	2.98%	1.21%	3.08%	0.10%	2.98%	4.19%
[1989-95]	2.22%	2.69%	0.46%	3.43%	0.07%	3.36%	3.82%
[1990-95]	2.99%	2.73%	-0.26%	3.74%	0.05%	3.69%	3.42%
[1991-95]	3.22%	2.62%	-0.61%	3.22%	0.20%	3.02%	2.41%
[1986-98]	2.07%	2.89%	0.82%	3.66%	0.30%	3.35%	4.17%
[1987-98]	1.81%	2.94%	1.13%	3.67%	0.24%	3.44%	4.56%
[1988-98]	1.91%	2.89%	0.98%	3.66%	0.30%	3.36%	4.34%
[1989-98]	2.24%	2.68%	0.44%	3.96%	0.30%	3.66%	4.10%
[1990-98]	2.76%	2.71%	-0.05%	4.22%	0.31%	3.91%	3.87%
[1991-98]	2.87%	2.63%	-0.23%	3.96%	0.43%	3.53%	3.29%
[1992-98]	3.38%	2.76%	-0.62%	4.19%	0.70%	3.50%	2.88%
[1993-98]	3.40%	2.69%	-0.71%	4.33%	0.54%	3.79%	3.08%
[1994-98]	2.82%	2.79%	-0.03%	4.42%	0.63%	3.79%	3.76%

Chart D2: RBOC Interstate Revenues

Year	End User A	Interstate Switched Access B	Special Access C	Total Interstate D = A + B + C
1984				
1985	\$1,499,413,893	\$10,906,203,190	\$1,960,688,644	\$14,366,305,727
1986	\$2,400,475,814	\$10,484,265,170	\$2,574,800,716	\$15,459,541,700
1987	\$3,090,639,929	\$9,611,996,187	\$2,657,677,439	\$15,360,313,555
1988	\$3,604,221,000	\$9,662,529,000	\$2,539,698,000	\$15,806,448,000
1989	\$4,398,692,000	\$9,092,575,000	\$2,253,922,000	\$15,745,189,000
1990	\$4,679,142,000	\$8,595,750,000	\$2,209,064,000	\$15,483,956,000
1991	\$4,828,177,000	\$8,514,130,000	\$2,119,037,000	\$15,461,344,000
1992	\$4,963,262,000	\$8,650,880,000	\$2,153,565,000	\$15,767,707,000
1993	\$5,244,094,000	\$8,999,065,000	\$2,097,997,000	\$16,341,156,000
1994	\$5,589,662,000	\$9,293,783,000	\$2,217,125,000	\$17,100,570,000
1995	\$5,770,285,000	\$9,332,869,000	\$2,529,667,000	\$17,632,821,000
1996	\$5,930,960,000	\$9,409,639,000	\$3,070,598,000	\$18,411,197,000
1997	\$6,268,026,000	\$8,763,815,000	\$3,851,028,000	\$18,882,869,000
1998	\$7,807,872,000	\$7,275,241,000	\$4,815,249,000	\$19,898,362,000

Chart D3: RBOC REVENUES (Excluding Miscellaneous Services)

Year	Local Service A	Intrastate Toll and Intrastate Access B	Interstate C	Total D = A + B + C
1984				
1985	\$26,960,554,164	\$13,047,095,682	\$14,366,305,727	\$54,373,955,573
1986	\$28,626,174,049	\$13,538,946,795	\$15,459,541,700	\$57,624,662,544
1987	\$29,150,842,991	\$14,166,723,124	\$15,360,313,555	\$58,677,879,670
1988	\$29,226,988,000	\$14,994,975,000	\$15,806,448,000	\$60,028,411,000
1989	\$29,973,157,000	\$14,868,219,000	\$15,745,189,000	\$60,586,565,000
1990	\$30,699,085,000	\$15,014,729,000	\$15,483,956,000	\$61,197,770,000
1991	\$32,059,008,000	\$14,522,276,000	\$15,461,344,000	\$62,042,628,000
1992	\$33,359,990,000	\$14,225,181,000	\$15,767,707,000	\$63,352,878,000
1993	\$34,598,957,000	\$14,496,831,000	\$16,341,156,000	\$65,436,944,000
1994	\$35,758,637,000	\$14,355,983,000	\$17,100,570,000	\$67,215,190,000
1995	\$37,684,860,000	\$13,123,225,000	\$17,632,821,000	\$68,440,906,000
1996	\$40,523,387,000	\$12,987,476,000	\$18,411,197,000	\$71,922,060,000
1997	\$42,460,592,000	\$12,308,613,000	\$18,882,869,000	\$73,652,074,000
1998	\$44,993,354,000	\$11,978,176,000	\$19,898,362,000	\$76,869,892,000

Chart D4: Calculation of Fisher Ideal Index for Interstate Output

Year	Revenue Shares			Quantities			Output Indices			Interstate Output Quantity Index	Growth
	End User	Interstate Switched Access	Special Access	Access Lines	Switched Access Minutes	Special Access Lines	Laspeyres A	Paasche B	Fisher Relative C=(A*B)^0.5		
1984											
1985	10.44%	75.92%	13.65%	92,671,959	156,853,820,000	1,230,590	1.000000	1.000000	1.000000	1.000000	
1986	15.53%	67.82%	16.66%	95,333,884	157,302,701,000	1,664,101	1.053249	1.052253	1.052751	1.052751	5.14%
1987	20.12%	62.58%	17.30%	98,228,585	173,154,171,000	1,764,445	1.083098	1.078813	1.080953	1.137975	7.78%
1988	22.80%	61.13%	16.07%	98,270,787	187,663,836,000	2,701,817	1.144443	1.114960	1.129605	1.285462	12.19%
1989	27.94%	57.75%	14.31%	101,190,050	210,406,134,000	2,448,090	1.065766	1.058920	1.062338	1.365595	6.05%
1990	30.22%	55.51%	14.27%	103,857,988	231,960,296,000	3,518,005	1.129086	1.114500	1.121769	1.531882	11.49%
1991	31.23%	55.07%	13.71%	107,383,807	246,710,182,000	5,181,699	1.111811	1.094856	1.103301	1.690127	9.83%
1992	31.48%	54.86%	13.66%	108,938,065	262,187,655,000	6,033,139	1.062516	1.060258	1.061386	1.793878	5.96%
1993	32.09%	55.07%	12.84%	112,196,681	278,173,161,000	10,153,615	1.136148	1.102619	1.119258	2.007812	11.27%
1994	32.69%	54.35%	12.97%	115,264,861	298,342,017,323	13,824,365	1.095119	1.086800	1.090952	2.190425	8.71%
1995	32.72%	52.93%	14.35%	119,887,506	334,981,582,000	16,107,677	1.101268	1.099925	1.100596	2.410774	9.59%
1996	32.21%	51.11%	16.68%	125,333,996	363,445,050,000	20,775,150	1.101412	1.100708	1.101060	2.654407	9.63%
1997	33.19%	46.41%	20.39%	131,458,355	387,587,696,669	24,479,958	1.079432	1.081360	1.080396	2.867810	7.73%
1998	39.24%	36.56%	24.20%	136,170,133	407,903,661,000	31,620,187	1.095710	1.094610	1.095160	3.140710	9.09%
										Average[1986-95]	8.80%
										Average[1986-97]	8.78%
										Average[1986-98]	8.80%

Chart D5: Calculation of Fisher Ideal Index for Total Company Output

Year	Revenue Shares			Quantities			Output Indices			Total Company Output Index	Growth
	Local Service	Intrastate Toll and Intrastate Access	Interstate	Access Lines	Intrastate DEMs	Interstate Quantity Index	Laspeyres	Paasche	Fisher Relative C=(A*B)^0.5		
	A	B	C				A	B			
1984											
1985	49.58%	24.00%	26.42%	92,671,959	164,191,177,000	1.000000	1.000000	1.000000	1.000000	1.000000	
1986	49.68%	23.50%	26.83%	95,333,884	173,173,536,000	1.052751	1.041307	1.041125	1.041216	1.041216	4.04%
1987	49.68%	24.14%	26.18%	98,228,585	183,597,411,000	1.137975	1.050944	1.050367	1.050656	1.093959	4.94%
1988	48.69%	24.98%	26.33%	98,270,787	191,904,837,000	1.285462	1.045065	1.043008	1.044036	1.142133	4.31%
1989	49.47%	24.54%	25.99%	101,190,050	207,298,177,000	1.365595	1.050915	1.050139	1.050527	1.199841	4.93%
1990	50.16%	24.53%	25.30%	103,857,988	217,913,904,000	1.531882	1.057256	1.055190	1.056222	1.267299	5.47%
1991	51.67%	23.41%	24.92%	107,383,807	219,713,721,000	1.690127	1.045193	1.044077	1.044635	1.323865	4.37%
1992	52.66%	22.45%	24.89%	108,938,065	224,278,538,000	1.793878	1.027640	1.027198	1.027419	1.360164	2.70%
1993	52.87%	22.15%	24.97%	112,196,881	227,540,869,000	2.007812	1.048699	1.047275	1.047987	1.425434	4.68%
1994	53.20%	21.36%	25.44%	115,264,861	235,362,364,000	2.190425	1.044787	1.044353	1.044570	1.488965	4.36%
1995	55.06%	19.17%	25.76%	119,887,506	246,926,539,000	2.410774	1.057423	1.056813	1.057118	1.574012	5.55%
1996	56.34%	18.06%	25.60%	125,333,996	263,719,641,000	2.654407	1.064092	1.063240	1.063666	1.674223	6.17%
1997	57.65%	16.71%	25.64%	131,458,355	273,526,580,000	2.867810	1.054827	1.054772	1.054800	1.765970	5.34%
1998	58.53%	15.58%	25.89%	136,170,133	296,776,339,000	3.140710	1.059265	1.058149	1.058707	1.869644	5.70%
Average[1986-95]											4.54%
Average[1986-97]											4.74%
Average[1986-98]											4.81%

Chart D6: Labor Input Price and Growth

Year	Total Employees A	Total Compensation B	Labor Rate Annual C = B / A	Labor Price Index (Base = 1985)	Labor Growth %Chg in A
1984					
1985	504,113	16,991,572,326	33705.88	1.000000	
1986	482,698	16,728,435,454	34656.11	1.028192	-4.34%
1987	477,714	16,978,905,847	35541.99	1.054474	-1.04%
1988	466,827	17,030,359,791	36481.09	1.082336	-2.31%
1989	461,149	16,910,850,694	36671.12	1.087974	-1.22%
1990	443,105	17,586,868,921	39690.07	1.177541	-3.99%
1991	414,457	17,186,211,200	41466.81	1.230255	-6.68%
1992	411,167	17,160,988,000	41737.27	1.238279	-0.80%
1993	395,639	17,956,438,000	45385.91	1.346528	-3.85%
1994	367,196	17,154,284,000	46716.97	1.386018	-7.46%
1995	346,843	16,203,522,000	46717.17	1.386024	-5.70%
1996	338,040	16,597,889,075	49100.37	1.456730	-2.57%
1997	338,177	17,451,673,000	51605.14	1.531043	0.04%
1998	338,404	18,128,861,000	53571.65	1.589386	0.07%
			Average[1986-95]		-3.74%
			Average[1986-97]		-3.33%
			Average[1986-98]		-3.07%

Chart D7: Summary of Capital Adjustments and Average Depreciation

Year	TPIS.BOY A	Unadj. Additions B	TPIS.EOY C	Retires D=A+B-C	Adjustment Factor E	Adjusted Additions F = B * E	Adjusted EOY TPIS G = A+F-D	Depreciation Accruals H	Adjusted Depreciation Rate I=H/((A+G)/2)
1984									
1985	138,879,365	15,001,998	149,061,793	4,819,569	0.8880	13,321,774	147,381,569	10,241,376	7.155%
1986	149,061,793	14,842,725	159,010,189	4,894,328	0.8880	13,180,340	157,347,804	11,826,961	7.720%
1987	159,010,189	14,138,370	167,720,577	5,427,983	0.8880	12,554,872	166,137,079	13,311,655	8.188%
1988	168,505,114	14,284,742	175,860,216	6,929,640	1.0000	14,284,742	175,860,216	13,134,992	7.629%
1989	175,860,216	13,283,569	182,978,381	6,165,404	1.0000	13,283,569	182,978,381	13,420,810	7.480%
1990	182,978,381	14,476,334	187,168,695	10,286,020	1.0000	14,476,334	187,168,695	13,439,933	7.262%
1991	187,168,695	14,527,049	192,034,545	9,661,199	1.0000	14,527,049	192,034,545	13,200,593	6.962%
1992	192,034,545	14,611,866	196,411,915	10,234,496	1.0000	14,611,866	196,411,915	13,337,581	6.867%
1993	196,411,915	14,860,116	203,082,418	8,189,613	1.0000	14,860,116	203,082,418	14,032,782	7.025%
1994	203,082,418	14,717,999	209,325,562	8,474,855	1.0000	14,717,999	209,325,562	14,863,198	7.208%
1995	209,325,562	15,374,568	217,430,207	7,269,923	1.0000	15,374,568	217,430,207	15,358,553	7.198%
1996	217,430,207	18,026,150	227,317,120	8,139,237	1.0000	18,026,150	227,317,120	16,252,281	7.309%
1997	227,317,120	18,253,199	236,896,179	8,674,140	1.0000	18,253,199	236,896,179	16,667,034	7.181%
1998	236,896,179	18,553,791	248,970,288	6,479,681	1.0000	18,553,791	248,970,289	17,154,619	7.061%
							Average[1985-95]		7.336%
							Average[1985-97]		7.322%
							Average[1985-98]		7.303%

Chart D8: Construction of Materials Quantity Index

Year	Materials Price Index (1985=1.00) A	Operating Expense B	Depreciation & Amortization Expense C	Employee Compensation D	Materials Expense E = B - C - D	Materials Quantity Index F = E / A	Materials Quantity Index (1985 = 1.0) G	Materials Quantity Index Growth H
1984								
1985	1.000000	40,953,072,435	10,024,710,656	16,991,572,326	13,936,789,453	13,936,789,453	1.000000	
1986	1.031346	42,424,084,849	11,592,001,248	16,728,435,454	14,103,648,147	13,674,987,526	0.981215	-1.90%
1987	1.053529	44,293,127,430	13,316,999,560	16,978,905,847	13,997,222,023	13,286,033,126	0.953307	-2.89%
1988	1.086392	46,809,139,000	13,646,937,000	17,030,359,791	16,131,842,209	14,849,003,149	1.065454	11.12%
1989	1.126234	48,600,813,000	13,860,101,000	16,910,850,694	17,829,861,306	15,831,394,231	1.135943	6.41%
1990	1.172025	49,544,744,000	13,931,515,000	17,586,868,921	18,026,360,079	15,380,530,820	1.103592	-2.89%
1991	1.204935	50,901,049,000	13,499,778,000	17,186,211,200	20,215,059,800	16,776,884,245	1.203784	8.69%
1992	1.234797	50,698,625,000	13,822,882,000	17,160,988,000	19,714,755,000	15,965,992,971	1.145601	-4.95%
1993	1.255352	52,766,635,000	14,244,514,000	17,956,438,000	20,565,683,000	16,382,401,649	1.175479	2.57%
1994	1.291436	55,916,863,000	15,068,058,000	17,154,284,000	23,694,521,000	18,347,418,469	1.316474	11.33%
1995	1.321671	56,831,094,000	15,556,284,000	16,203,522,000	25,071,288,000	18,969,381,288	1.361101	3.33%
1996	1.361400	57,884,494,000	16,377,242,000	16,597,889,075	24,909,362,925	18,296,870,339	1.312847	-3.61%
1997	1.395497	59,731,175,000	16,758,832,000	17,451,673,000	25,520,670,000	18,287,867,671	1.312201	-0.05%
1998	1.430735	60,836,253,000	17,306,863,000	18,128,861,000	25,400,529,000	17,753,487,504	1.273858	-2.97%

Chart D8a: Adjustments of 1985-87 RBOC Operating Expenses for Accounting Changes

	USTA Study Operating Expense A	Nonregulated Expense Adjustmts B	Capital/Expense Shift C	Shift Factor D = (A+B+C)/A	RBOC Operating Expense E	Adjusted Operating Exp. F = D * E
1985	46,223,368,251	406,886,403	1,985,079,714	1.05175	38,938,104,053	40,953,072,435
1986	48,113,849,487	471,112,072	1,959,363,711	1.05052	40,384,079,165	42,424,084,849
1987	49,562,282,080	1,089,570,002	1,908,791,665	1.06050	41,766,392,483	44,293,127,430

Chart D9: Capital Quantity and Price Index Calculations

Year	Benchmark A	Adjusted Capital Additions B	BEA Composite Asset Price C	Capital Stock Quantity D	Capital Input Quantity E	Capital Input Quantity Growth F	Property Income /w Depreciation G	Capital Rental Price** H	Capital Rental Price Index I	Rental Price Index Growth J
1984		n/a		103,903,095						
1985	109,602,959	13,321,774	1.000000	109,602,710	1.000000		23,445,593,794	0.225649	1.000000	
1986		13,180,340	1.010482	114,606,056	1.054855	0.053403	26,792,578,943	0.244452	1.083329	8.00%
1987		12,554,872	1.027339	118,419,511	1.103009	0.044639	27,701,751,800	0.241713	1.071191	-1.13%
1988		14,284,742	1.030466	123,594,868	1.139711	0.032733	26,866,209,000	0.226873	1.005427	-6.34%
1989		13,283,569	1.070178	126,940,642	1.189521	0.042776	25,845,853,000	0.209118	0.926740	-8.15%
1990		14,476,334	1.089729	130,912,833	1.221721	0.026711	25,584,541,000	0.201547	0.893191	-3.69%
1991		14,527,049	1.102220	134,489,094	1.259951	0.030812	24,641,357,000	0.188227	0.834181	-6.84%
1992		14,611,866	1.108304	137,807,183	1.294370	0.026951	26,776,208,415	0.199096	0.882326	5.61%
1993		14,860,116	1.112312	141,057,540	1.326305	0.024372	29,790,583,225	0.216176	0.958020	8.23%
1994		14,717,999	1.117639	143,878,628	1.357587	0.023312	31,539,985,962	0.223597	0.990906	3.38%
1995		15,374,568	1.114809	147,115,146	1.384739	0.019802	34,745,599,902	0.241492	1.070214	7.70%
1996		18,026,150	1.118623	152,437,614	1.415888	0.022246	36,601,808,412	0.248797	1.102586	2.98%
1997		18,253,199	1.117644	157,586,899	1.467113	0.035540	38,074,385,342	0.249770	1.106899	0.39%
1998		18,553,791	1.117690	162,626,701	1.516672	0.033222	39,210,947,194	0.248821	1.102693	-0.38%

Calculation of Property Income Based on External Rate of Return

Year	Earnings Share in Property Income K	Value Line Industrials Return on Total Capital L	(1-K) * G M	(K*G)/(D _{t-1} *1000) N	N _{t-1} +(L-L _{t-1}) O	O*D _{t-1} *1000 P	Property Income M+P Q
1991	33.2%	8.5%	16,460,426,476	0.062491	0.062491	8,180,930,524	24,641,357,000
1992	36.2%	9.6%	16,892,412,130		0.073491	9,883,796,285	26,776,208,415
1993	33.6%	10.9%	17,871,442,472		0.086491	11,919,140,753	29,790,583,225
1994	32.0%	11.9%	17,929,141,800		0.096491	13,610,844,162	31,539,985,962
1995	28.5%	12.9%	19,423,758,640		0.106491	15,321,841,262	34,745,599,902
1996	30.2%	12.7%	21,229,535,984		0.104491	15,372,272,428	36,601,808,412
1997	30.3%	13.2%	21,383,772,507		0.109491	16,690,612,835	38,074,385,342
1998	28.0%	11.9%	24,005,161,440		0.096491	15,205,785,754	39,210,947,194

Chart D10: Factor Shares of Total Payments

Year	Labor Compensation A	Materials Payment B	Property Income /w Depreciation C	Total Factor Payment D = A + B + C	Labor Compensation Share	Materials Payment Share	Property Income /w Depreciation Share
1984							
1985	16,991,572,326	13,936,789,453	23,445,593,794	54,373,955,573	31.25%	25.63%	43.12%
1986	16,728,435,454	14,103,648,147	26,792,578,943	57,624,662,544	29.03%	24.48%	46.49%
1987	16,978,905,847	13,997,222,023	27,701,751,800	58,677,879,670	28.94%	23.85%	47.21%
1988	17,030,359,791	16,131,842,209	26,866,209,000	60,028,411,000	28.37%	26.87%	44.76%
1989	16,910,850,694	17,829,861,306	25,845,853,000	60,586,565,000	27.91%	29.43%	42.66%
1990	17,586,868,921	18,026,360,079	25,584,541,000	61,197,770,000	28.74%	29.46%	41.81%
1991	17,186,211,200	20,215,059,800	24,641,357,000	62,042,628,000	27.70%	32.58%	39.72%
1992	17,160,988,000	19,714,755,000	26,776,208,415	63,651,951,415	26.96%	30.97%	42.07%
1993	17,956,438,000	20,565,683,000	29,790,583,225	68,312,704,225	26.29%	30.11%	43.61%
1994	17,154,284,000	23,694,521,000	31,539,985,962	72,388,790,962	23.70%	32.73%	43.57%
1995	16,203,522,000	25,071,288,000	34,745,599,902	76,020,409,902	21.31%	32.98%	45.71%
1996	16,597,889,075	24,909,362,925	36,601,808,412	78,109,060,412	21.25%	31.89%	46.86%
1997	17,451,673,000	25,520,670,000	38,074,385,342	81,046,728,342	21.53%	31.49%	46.98%
1998	18,128,861,000	25,400,529,000	39,210,947,194	82,740,337,194	21.91%	30.70%	47.39%

Chart D11: Input Quantity Index

	Shares			Quantities			Quantity Indices				Growth
	Labor Compensation	Materials Payment	Property Income /w Depreciation	Labor	Materials	Capital	Laspeyres A	Paasche B	Fisher Relative C=(A*B)^0.5	Fisher Chain	
Year											
1984											
1985	31.25%	25.63%	43.12%	504,113	13,936,789,453	1.00000	1.00000	1.00000	1.00000	1.00000	
1986	29.03%	24.48%	46.49%	482,698	13,674,987,526	1.05486	0.96820	0.96822	1.00611	1.00611	0.61%
1987	28.94%	23.85%	47.21%	477,714	13,286,033,126	1.10301	0.98139	0.98140	1.01099	1.01717	1.09%
1988	28.37%	26.87%	44.76%	466,827	14,849,003,149	1.13971	1.04067	1.04083	1.03731	1.05512	3.66%
1989	27.91%	29.43%	42.66%	461,149	15,831,394,231	1.18952	1.02594	1.02654	1.03384	1.09082	3.33%
1990	28.74%	29.46%	41.81%	443,105	15,380,530,820	1.22172	0.96634	0.96623	0.99151	1.08156	-0.85%
1991	27.70%	32.58%	39.72%	414,457	16,776,884,245	1.25995	1.01403	1.01340	1.02084	1.10410	2.06%
1992	26.96%	30.97%	42.07%	411,167	15,965,992,971	1.29437	0.97023	0.97005	0.99312	1.09650	-0.69%
1993	26.29%	30.11%	43.61%	395,639	16,382,401,649	1.32630	0.99637	0.99530	1.00809	1.10537	0.81%
1994	23.70%	32.73%	43.57%	367,196	18,347,418,469	1.35759	1.03052	1.03050	1.02749	1.13575	2.71%
1995	21.31%	32.98%	45.71%	346,843	18,969,381,288	1.38474	0.99639	0.99689	1.00700	1.14370	0.70%
1996	21.25%	31.89%	46.86%	338,040	18,296,870,339	1.41589	0.96850	0.96855	0.99314	1.13585	-0.69%
1997	21.53%	31.49%	46.98%	338,177	18,287,867,671	1.46711	0.99987	0.99987	1.01674	1.15487	1.66%
1998	21.91%	30.70%	47.39%	338,404	17,753,487,504	1.51667	0.98292	0.98301	1.00662	1.16252	0.66%

Chart D12: Input Price Index

	Shares			Prices			Price Indices				Growth
	Labor Compensation	Materials Payment	Property Income /w Depreciation	Labor	Materials	Capital	Laspeyres A	Paasche B	Fisher Relative C=(A*B)^0.5	Fisher Chain	
Year											
1984											
1985	31.25%	25.63%	43.12%	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
1986	29.03%	24.48%	46.49%	1.02819	1.03135	1.08333	1.06395	1.06482	1.05335	1.05335	5.20%
1987	28.94%	23.85%	47.21%	1.05447	1.05353	1.07119	1.00008	0.99954	1.00720	1.06094	0.72%
1988	28.37%	26.87%	44.76%	1.08234	1.08639	1.00543	0.96969	0.97133	0.98622	1.04632	-1.39%
1989	27.91%	29.43%	42.66%	1.08797	1.12623	0.92674	0.96486	0.96543	0.97626	1.02148	-2.40%
1990	28.74%	29.46%	41.81%	1.17754	1.17202	0.89319	0.99518	0.99415	1.01874	1.04063	1.86%
1991	27.70%	32.58%	39.72%	1.23025	1.20494	0.83416	0.97284	0.97412	0.99311	1.03346	-0.69%
1992	26.96%	30.97%	42.07%	1.23828	1.23480	0.88233	1.04289	1.04351	1.03304	1.06761	3.25%
1993	26.29%	30.11%	43.61%	1.34653	1.25535	0.95802	1.05647	1.05645	1.06461	1.13659	6.26%
1994	23.70%	32.73%	43.57%	1.38602	1.29144	0.99091	1.03205	1.03192	1.03132	1.17219	3.08%
1995	21.31%	32.98%	45.71%	1.38602	1.32167	1.07021	1.05575	1.05556	1.04287	1.22244	4.20%
1996	21.25%	31.89%	46.86%	1.45673	1.36140	1.10259	1.03017	1.03017	1.03457	1.26470	3.40%
1997	21.53%	31.49%	46.98%	1.53104	1.39550	1.10690	1.01247	1.01229	1.02052	1.29066	2.03%
1998	21.91%	30.70%	47.39%	1.58939	1.43073	1.10269	1.00786	1.00742	1.01418	1.30896	1.41%